5.10 CULVERT, SEWER, UNDER-DRAIN PIPE, AND PRECAST CONCRETE DRAINAGE SYSTEM PRODUCTS

5.10.01 GENERAL

This section covers the inspection, sampling and testing of pipe for culverts, storm and sanitary sewers, under-drains and precast drainage system products including concrete pipe, end sections, inlets, manholes, boxes and related concrete accessories. This procedure **does not apply** to prestressed concrete beams.

5.10.02 PRECAST CONCRETE

(a) General.

Any producer intending to supply precast products to the State must have the supplying production facility prequalified according to, and in compliance with, the requirements of the latest revision of Standard Specifications, Subsection 1902 (90P/M-227). State Inspectors will randomly tour these facilities to witness or conduct strength tests, inspect steel placement, determine the level of visual defects, and evaluate conformance to dimensional requirements. Verification samples will be taken by State Inspectors at a frequency of not less than once every five lots for each product. These samples may include, but are not restricted to, any combination of cylinders, core samples, and, for pipe, three edge bearing tests.

(b) Basis of Acceptance.

See Standard Specifications Manual Subsection 1902.

(c) Prequalified Status.

A list of prequalified production facilities will be maintained by the Bureau of Materials and Research and published in the List of Prequalified Materials and Materials Sources (PQL).

(d) Product Identification.

Products in compliance with the Quality Control Program of the latest revision of Subsection 1902 (90P/M-227) are to display a unique facility identifier (name of plant or logo/code), date manufactured, AASHTO class when applicable, and size. Products not intended for use by KDOT are to be clearly marked as such. The unique facility identifiers will be included in the PQL.

5.10.03 CLAY PIPE

(a) General.

Most clay pipe used on Kansas projects is produced at plants within or near the borders of the State. The primary raw material is a clay or shale or a combination of the two which is blended with other ingredients including sufficient water to insure workability, molded to meet dimensional requirements and fired in a kiln.

(b) Basis of Acceptance.

See Standard Specifications Manual Subsection 1903.

(c) Methods of Inspection and Sampling at Destination.

(1) All pipe should be inspected at destination to determine if the pipe has been damaged during shipment and handling and to check for identification numbers that show that the pipe has been previously accepted. Cracks in pipe without factory molded joints may be detected by lightly tapping each piece with a hammer. A sound, uncracked piece will produce a bell-like ring while cracked pieces will produce a dull thud. This test is not reliable for pipe with factory molded joints since the joint material deadens the sound.

All accepted pipe is identified by stenciling the appropriate information described in paragraph 5.10.02 (c)(2) on each piece. When possible, the stencil is placed on the inside near the bell end. The actual location will be shown on the test report. If uninspected pipe arrives on the project, the District Materials Engineer should be notified so arrangements can be made for having the pipe inspected.

5.10.04 CAST IRON PIPE

(a) General.

Cast iron pipe is generally produced in foundries located at points outside the State and is shipped directly to the project without inspection.

(b) Basis of Acceptance.

See Standard Specifications Manual Subsection 1904.

(c) Inspection.

If pipe with a push-on or a mechanical joint is furnished, the joint elements should be examined carefully to determine whether or not they will produce a pressure tight seal. Each length should be carefully examined for all manufacturing defects or damage during handling that will impair its usefulness.

5.10.05 CORRUGATED METAL PIPE, PIPE ARCHES AND END SECTIONS

(a) General.

Steel pipe is generally produced at plants located within or adjacent to the State. Aluminum pipe is produced at points outside the State. Corrugated metal pipe is fabricated from galvanized steel in coils or corrugated sheets of galvanized steel or aluminum. It is fabricated by one of two methods, either of which is acceptable.

One type of pipe has helical corrugations with a continuous seam paralleling the corrugations. Another type is circumferentially corrugated with lap joints fastened by rivets or by spot welding.

Corrugated metal pipe arches are formed from circular pipe by pressure applied through a

properly shaped mandrel to result in a multi-radius pipe having an arch shaped top with a slightly flattened bottom.

(b) Basis of Acceptance.

See Standard Specifications Manual Subsection 1905.

(c) Inspection at Destination.

As a minimum, the Field Engineer should inspect the pipe at destination for possible damage during handling and shipping. A tag with the project number and station number should be attached to each section of pipe by the manufacturer. Defective pipe or pipe of questionable quality should be reported to the District Materials Engineer. If the pipe has not been inspected at the fabricator's plant or some other location, a more stringent inspection will be required at the job site, consult the District Materials Engineer for guidance.

5.10.06 STRUCTURAL PLATE FOR PIPE, PIPE ARCHES AND ARCHES

(a) General.

The individual plates are corrugated, cut to size, bent to shape and hot-dipped galvanized, if required, at fabricating plants and shipped to the project for assembly into drainage structures. At present, fabricating and galvanizing is done outside the State. If bituminous coating is specified, the sections are usually coated at plants within the State. Therefore, bituminous coated sections are inspected by Department personnel prior to shipment to the project. Uncoated sections are usually shipped direct to the project without inspection.

(b) Basis of Acceptance.

See Standard Specifications Manual Subsection 1906.

(c) Inspection, Sampling and Testing.

Each section is carefully examined for conformance to dimensional requirements, pitch and depth of corrugations, thickness of metal, uniformity and thickness and condition of zinc coating and identification of metal by brand and heat number.

Receipt and approval of the fabricator's certificate of compliance as required in AASHTO M-167 or M-219. Furnish a copy of this certificate together with the mill tests for each heat of base metal to the Engineer of Tests for each order.

Accessories will be sampled at destination and tested for conformance to applicable requirements of AASHTO M-167 or M-219.

Inspection of the bituminous coating, if specified on the plans, is performed as outlined in subsections **5.10.07.**

(d) Reporting.

Acceptance reports are issued by the Engineer in charge of making the inspection.

5.10.07 ASPHALT COATED CORRUGATED METAL PIPE, PIPE ARCHES, COUPLING BANDS AND STRUCTURAL PLATE

(a) General.

The asphalt coating is applied to pipe items that have been previously inspected for weight of zinc coating, dimensions, manufacturing details, etc. Coating is usually performed at pipe fabricating plants located within or near State boundaries prior to shipment.

(b) Basis of Acceptance.

See Standard Specifications Manual Subsection 1907.

(c) Identification.

The pipe is identified by tags attached to each piece. The tags bear the laboratory number under which the pipe was inspected and the date of inspection.

(d) Reporting.

Acceptance reports are issued by the Engineer in charge of the inspection of the coated material.

5.10.08 CORRUGATED POLYETHYLENE TUBING FOR UNDERDRAINS

(a) General.

Small diameter polyethylene tubing is used for installing underdrains and edge drains. Most is manufactured outside the state.

(b) Basis of Acceptance.

See Standard Specifications Manual Subsection 1908.

5.10.09 CORRUGATED POLYETHYLENE PIPE

(a) General.

Corrugated polyethylene pipe is used for entrance pipe and when specified on the plans, cross-road pipe. Most is manufactured outside the state.

(b) Basis of Acceptance.

See Standard Specifications Manual Subsection 1909.

5.10.10 POLYVINYL CHLORIDE (PVC) PIPE

(a) General.

PVC pipe is used for sewers, underdrains, edgedrains and as entrance and cross-road pipe when specified on the plans. Most is manufactured outside the state.

(b) Basis of Acceptance.

See Standard Specifications Manual Subsection 1910.